

# Medical and Social Rehabilitation of Patients with Vertogenic Cingulate Radiculopathy

Samiyev Asliddin Sayitovich

Assistant of Department of DCTF Neurology, Samarkand State Medical Institute, Samarkand, Uzbekistan

## ABSTRACT

The review demonstrates the urgency of the problem of lumbosacral radiculopathy. Epidemiological data, causes, mechanisms of development, clinical picture and methods of pharmacotherapy of neuropathic pain in radiculopathy are presented. An algorithm for instrumental diagnostics and treatment is described. Its clinical efficacy in neuropathic pain syndrome has been studied in a number of clinical randomized trials that demonstrated its analgesic effect, as well as the ability to cause regression of concomitant psychosomatic disorders and insomnia in patients with lumbosacral radiculopathy.

**KEYWORDS:** Radiculopathy, syndrome, mechanism, vertebral artery, pain

## INTRODUCTION

An increase in the life expectancy of the population of countries with developed economies, the accumulation of elderly and senile people in the population, physical inactivity are only part of the reasons for the formation of a group of people with chronic pain syndrome, a component of which is neuropathic pain.

The most common type of neuropathic pain syndrome (NBS) is chronic back pain, which occurs in 20-30% of all cases of chronic pain. The pathophysiology of back pain includes a complex of nociceptive and neuropathic mechanisms caused by damage to nerve fibers by degenerative processes in the spine. The destruction of nociceptive fibers of the nerve root by structures of a degenerating disc (local neuropathic pain), mechanical compression or narrowing of the lumen of the spinal canal (mechanical neuropathic radicular pain) or under the influence of inflammatory mediators in systemic diseases without any mechanical compression is the main cause of neuropathic pain in the disease.

The problem becomes even more urgent due to the low efficiency of treatment, despite the abundance of modern pharmacological agents. The disease is chronic, progressive and negatively affects all areas of the patient's life, including sleep, mood, self-esteem, performance, interpersonal relationships, and significantly impairs the quality of life, requiring a significant increase in health care costs.

This review summarizes the current trends in the treatment of NBS of radiculogenic origin, and also analyzes the efficacy of pregabalin, a drug of the latest generation of gabapentinoids.

## Evaluation of a patient with radiculopathy includes.

1. a thorough collection of anamnesis of the disease. To exclude the secondary nature of pain, a general physical examination and examination is also required;

2. determination of the localization and provoking factor of pain;
3. characteristics of pain:
  - beginning of appearance,
  - provoking factor,
  - duration,
  - intensity,
  - the nature of the pain.
4. determination of positive and negative sensory disorders: paresthesia (non-painful spontaneous sensations - creeping creeps, etc.), dysesthesia (unpleasant spontaneous or induced sensations), hyperalgesia (increased sensation of pain stimulus) and allodynia (pain irritant);
5. neurological examination, which is carried out according to the generally accepted method and includes:
  - study of cranial innervation,
  - research of motor and sensory spheres;
6. manual diagnostics, revealing functional disorders in the vertebral motor segments, in order to determine the degree of joint mobility of both the craniovertebral junction and the entire spine as a whole;
7. study of the muscle sphere and motor stereotype, muscle spasm and local muscle hypertonicity (trigger points);
8. determination of the characteristics of the psychoemotional state (especially after trauma).

## Instrumental diagnostics

To clarify the state of the bone apparatus, an instrumental examination is necessary:

1. Functional radiography (radiation diagnostics) - pictures in frontal and lateral projections in a sitting position, as well as in flexion and extension of the spine.

In most patients with cervical dorsopathy, X-ray examination of the spine reveals degenerative changes in the vertebral motor segments, which are mainly found at the level of CV – CVI, CVI – CVII and CIV – CV. The first spondylographic signs of disc dystrophy are the straightening of the cervical lordosis and the formation of local kyphosis at the level of the affected spinal motion segment. The earliest signs of degenerative changes are uncovertebral arthrosis mainly in the CIV – CV, CV – CVI and CIII – CIV segments. Spondyloarthrosis of the intervertebral joints is radiologically characterized by narrowing and deformation of the joint space, subchondral sclerosis of the articulating surfaces of the articular processes, and marginal bone growths. With the direction of the marginal bone growths anteriorly, their effect on the vertebral arteries is noted. To identify them, posterior images are taken through an open mouth. In arthrosis of the C0 – C1 and C1 – C2 joints, asymmetry of the craniovertebral joints, as well as the C1 – C2 articular spaces and the crevices of the Crivellier dentate

process, is noted. Arthrosis in the area of these joints is a common cause of compression of the vertebral artery.

Some patients have hypermobility (instability), which is manifested by pseudospondylolisthesis (anterior or, more often, posterior) and excessive movement in the spinal motion segment. The evidence of long-term hypermobility is the slope of the anterior-upper corner of the body of the underlying vertebra and neoarthrosis in the area of contact between the articular process and the arch.

Subluxation of the joint according to Kovacs is characterized on a lateral photograph of the neck by retrospondylolisthesis of the body, a violation of the relationship between the articular processes in the spinal motion segment (deviation of the posterior superior articular process, sliding of the lower downward), as well as axial opening of the articular gap, superposition of the shadow of the underlying upper body of the articular process on the shadow overlying vertebra. All this contributes to the trauma of the vertebral artery when the articular process is close to the deep part of the transverse process.

Neuroimaging study: magnetic resonance imaging (MRI) of the spine, which is the most modern, safe method, is distinguished by the absence of restrictions in the study plane and high image accuracy, which allows you to see in detail on the display screen, and then on X-ray film, sections of the spinal column and spinal cord.

In chronic radiculopathy, demyelination and degeneration of the spinal nerve develop, leading to hypotrophy or atrophy of the innervated muscles and loss of tendon reflexes. The clinical picture depends on the localization of the root involved in the process. The upper cervical roots (CII – CIV), in contrast to the lower ones, are very short, therefore, they are squeezed mainly by an osteophyte or a pathologically altered ligament. Clinically, depending on the affected root, pain and sensory disturbances are noted in the occipital and temporal regions, in the neck or shoulder girdle. There are practically no motor disorders in the upper cervical region. The lower roots are more often affected, since it is the lower part of the cervical spine that experiences a very large load, which creates the preconditions for the formation of intervertebral hernias. Pain and sensory disturbances spread with radiculopathy of the CV root in the shoulder girdle and along the front surface of the proximal part of the shoulder, with radiculopathy of the CVI root - from the neck and scapula to the shoulder girdle along the outer edge of the shoulder, the posterolateral surface of the forearm and lateral surface of the hand to the first or second fingers, with radiculopathy of the CVII root - along the back surface of the forearm to the third and fourth fingers, with radiculopathy CVIII root - along the medial surface of the shoulder, forearm and hand to the third, fourth or fifth fingers. In the thoracic region, pain can radiate along the intercostal nerves.

In the lumbar region, as well as in the cervical region, the lower roots are often affected. With the involvement of the three upper lumbar roots (LI, LII, LIII), pain, paresthesias within the inner and front surfaces of the thigh, groin, lower abdomen, pubis in the external genitalia are noted. With LIV lesion, pain and sensory disturbance are localized along the outer anterior thighs, the anterior surface of the knee joint,

and the anterior inner surface of the lower leg. With the defeat of the LV root, pain in the lower back with irradiation to the big toe, decreased sensitivity along the outer surface of the thigh, lower leg, the middle of the back of the foot, in the big toe, and paresis of the extensor of the big toe are noted. Compression of the S1 root leads to pain, decreased sensitivity in the area of the outer surface of the thigh, lower leg and foot to the little toe and fourth toe, loss of the plantar and Achilles reflexes.

#### Treatment algorithm

1. relief of pain;
2. removal of the inflammatory process;
3. strengthening of metabolic processes;
4. prevention of chronic pain syndrome;
5. carrying out a full course of rehabilitation measures;
6. prevention of relapse of exacerbations.

Since radiculopathy has a nociceptive component of pain, prescription of non-steroidal anti-inflammatory drugs (NSAIDs) and muscle relaxants, which are widely used in clinical practice, is pathogenetically justified. Taking into account the presence of a neuropathic component of pain in radiculopathy, symptom-modifying drugs with delayed action, anticonvulsants or antidepressants from the group of selective inhibitors of serotonin and norepinephrine reuptake are also recommended [10, 11].

When prescribing NSAIDs, there is a high risk of developing side symptoms, and primarily gastropathy. Patients at risk receive omeprazole. In order to identify safe ways to solve this problem, numerous clinical studies have been carried out both in Russia and abroad. It has been proven that in order to reduce the dose and duration of therapy with NSAIDs and anticonvulsants, it is justified to include in the course of treatment B vitamins, which are called neurotropic ones, since they regulate the metabolism of the main neurotransmitters and amino acids, stimulate protein synthesis and create conditions for more successful nerve regeneration.

Since the pathogenetic mechanisms are edema, inflammation, ischemia, root demyelination and degeneration, the drug L-lysine escinate is recommended for decongestant purposes (active ingredient: escinalysinate, 1 ml of concentrated solution contains 1 mg of L-lysine escinate). The drug is produced in the form of a concentrated solution intended for intravenous administration in ampoules of 5 ml No. 10. L-lysine escinate is able to suppress the activity of lysosomal hydrolases, which leads to a decrease in the rate of degradation of mucopolysaccharides in the connective tissue of the walls of small capillaries. L-lysine escinate has an analgesic effect, has a decongestant (antiexudative) effect. Against the background of treatment, the tone of the veins increases, the vascular-tissue permeability decreases, which helps to reduce edema. The daily dose of the drug for adults is 5-10 ml, which are diluted in 50-100 ml of sodium chloride, 0.9% solution for injection, and administered intravenously. In the absence of the possibility of drip introduction of L-lysine, escinat can be administered intravenously in a stream very slowly, 5 ml per 15 ml of saline. The maximum daily dose for adults is 20 ml. The duration of the drug use is 2-8 days, depending on the effectiveness of therapy.

Non-drug therapy includes:

- physiotherapy - hardware procedures based on the use of physical factors for treatment and improvement: infrared radiation, ultrasound, magnetic fields, light, heat, etc.;
- acupuncture (acupuncture, reflexology) - the oldest practice of point impact on the human body in order to relieve symptoms and, ideally, eliminate the causes of the disease;
- massage is a gentle but highly effective health-improving procedure that increases muscle and skin tone, improves blood flow and thus helps the body to recover.

## Conclusion

The currently available evidence of the high efficacy of pregabalin for the treatment of NBS, both in monotherapy and in combination with other drugs, allows the use of non-drug therapy, including for radiculopathy. The combination of pregabalin with other drugs, in particular NSAIDs, contributes to more effective relief of pain syndrome, reduces the severity of anxiety-depressive disorders, and also improves the quality of life of patients with radiculopathy.

Thus, the development of pathogenetically grounded principles of treatment for radiculopathy is a complex problem, the solution of which can be achieved by attracting a wide range of specialists and an integrated approach to therapeutic measures, including not only pharmacotherapy, but also psychotherapy, as well as an orthopedic regimen.

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